29 October 1973

SUBJECT: IRAC Agenda Item, Meeting of 5 November 73 - ASD(I) Proposal for COINS

1. PROBLEM

The purpose of this paper is to provide analysis and recommendations, for DCI use in the 5 November 73 IRAC meeting, on the following ASD(I) proposals relative to COINS:

a. ASD(I) letter to DCI of 4 October 73 contains a specific proposal for upgrading the existing COINS computer communication network, and describes this proposal as "only the first step toward the evolution of a worldwide integrated storage and retrieval network for intelligence support."

b. The ASD(I) letter also includes a proposed fiscal plan for FY-74 and FY-75. This plan includes not only (1) the costs of the above network, but also (2) costs for COINS program management, (3) R&D costs for monitoring the COINS system, and (4) R&D costs for a multi-level security study effort.

2. BACKGROUND

a. Recent progress in improving COINS. ASD(I) letter of 4 October 73 cites improvements instituted within the past several months. These include:

(1) Upgrading the COINS network to TK has permitted NPIC files to become available to the community. ASD(I) notes the number of community user queries has doubled. DCI should be aware that queries on NPIC files alone have risen from zero percent last spring to some 40 percent of all queries on COINS, and this percentage will increase.

(2) The joint working group reviewing file quality, mentioned in Dr. Hall's letter, is chaired by his representative, with DCI/IC Staff participation as well as membership by State, CIA, DIA, NSA, NPIC and the COINS Project Manager's Office. To date, this group has reviewedsome 50 files, to ascertain their potential suitability for COINS and the degree of need for each file by agencies other than the originator. As ASD(I) correctly reports, this effort is expanding the number of files available to users.

(a) Some files can be placed on the COINS network in the immediate future, since they are designed to make a one-time

DIA review completed

hard copy response to a query (the so-called "batch" method). This matches the current capability of the COINS network.

(b) Other files, which are of higher potential interest throughout the community in the long run, cannot be placed on the COINS network until the upgrading now proposed by ASD(I) is accomplished. This is because these files are designed to operate in an "interactive" mode, wherein the questioner talks back and forth with the file, via his terminal, to frame and refine his inquiry.

b. The review and improvement of COINS files requires a continuing effort. Specific improvements since the DCI named ASD(I) Executive Agent last spring are gains that were capable of accomplishment in the short run, and developments in planning for the future. These are important, but only a beginning. Further work looks toward the direction of enhancing the substantive quality of materials for COINS, as well as the accuracy and timeliness of files on COINS. This, in turn, raises questions as to the appropriate future scope of operation, membership and direction for the files working group.

c. Preparation and staffing of proposal for upgrading COINS communication network. The proposal attached to Dr. Hall's letter of 4 October 73 was developed by an ad hoc Computer Netting Group (CNG), established under the COINS Project Management Office, with DIA and NSA representatives as co-chairmen, and supported by private consultants. This plan was sent to DIA, NSA, CIA and State for formal coordination via the COINS Subsystem Managers, under transmittal of 9 July 73.

(1) CIA Response. CIA has concurred in the proposal to model the network after the ARPANET technology. CIA suggests the need for a more definitive implementation plan, including security protection for the network as part of the design criteria.

(2) Other Agency Responses. Not known.

(3) ASD(I) Position. ASD(I) has endorsed the plan, as evidenced by its transmittal to IRAC by Dr. Hall.

d. Salient points of COINS communication network proposal. The plan being presented by ASD(I) to IRAC includes the following major points:

(1) Elimination of the central computer message-switching device, which is a vulnerable point in the communication system, replacing it with a network that interconnects COINS participants through alternate routes.

(2) Upgrading the transmission lines, so that they will have a capability to operate high speed terminals in an interactive (i.e., conversational) mode. This is an essential prerequisite to adding to the COINS system those files which have been designed to operate only in an interactive system.

(3) Providing technical capability to include a sizeable expansion, worldwide, of participants in the COINS network. Also, interfacing the COINS network with the DoD IDHS Communication (IDHSC) network and the World Wide Military Command and Control System (WWMCCS) network.

(4) Upgrading the COINS network using proven technology and tested, available equipment. This led to the choice of the ARPANET, which is an operational, state-of-the-art network, developed for DoD by ARPA and now widely operational, spanning the United States and Hawaii. Improvements to ARPANET are continuing to be made, and these can be utilized for COINS at no direct expense for their development.

(5) Use of standard mini-computers at each node in the COINS communication network. These are variously called Interface Message Processors (IMPs), Terminal Interface Processors (TIPs) or Interactive Analyst Stations (IASs). They are part of the communication network and connect with the host computer of each participating agency.

e. Time Schedule for upgraded COINS communication network. The ASD(I) proposal states that "implementation of this plan is expected to take place over a 12 month period." This is correct, but it could be misunderstood.

(1) What the community gets. By the end of 12 months, if all goes smoothly, a minimum Washington area communication network can be brought into existence. This will link the new mini-computers at NSA, NPIC and DIA.

(2) What the community does not get. Accomplishment of the foregoing merely puts in operation a new communication network.

(a) It does not change the fact that each agency's host computer still requires the use of a unique language and procedures when operating in the network: the multi-language retrieval problem.

(b) While creating the new network is an essential precondition to adding certain files to COINS, this accomplishment in networking does nothing in the 12 month time frame to make COINS simpler for analysts to use: the file uniformity and data standards problem.

(c) An ultimate goal is to make COINS interactive for analyst users. That will require modification of software in the host computers throughout the community. It is not a task addressed by this ASD(I) proposal, and it is doubtful that this effort should even be commenced until the improved COINS communication network is tested and operational.

(d) Both CIA and the COINS Program Management Office have called attention to security problems. They are not likely to be solved in the 12-month time frame in which the initial upgraded communication network is to be created.

(3) Possible system degredation during changeover. The detailed plan (p. 4) states: "The present COINS network will continue to operate and to provide service while the upgraded communication system is being implemented. The transition from the present network to the upgraded network must be achieved with minimum degredation of service to operational users."

(4) The full implementation schedule for the upgraded COINS communication network is estimated at 28 months. The 12-month schedule provides an initial bare bones capability. (See Implementation Schedule, CNG Plan, pp. 42-4.)

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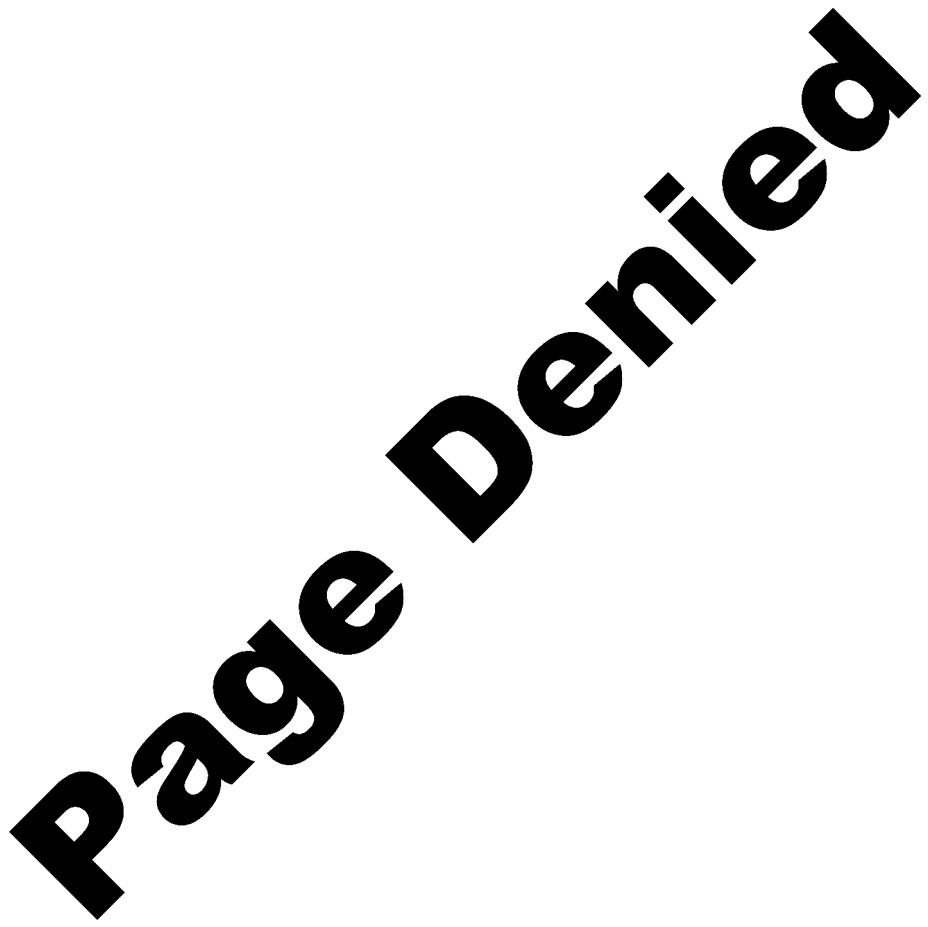
f. The ASD(I) fiscal plan. The proposal is to cover "all costs for the proposed COINS communication network". It calls for a total of

STATINTL [redacted] in FY-74 and [redacted] in FY-75.

(1) The foregoing totals cover procurement, installation and maintenance of the hardware and software for the network, i.e., the mini-computers, network control computer, COMSEC equipment, communications circuits, and hardware to interface a mini-computer to the host computer in each agency.

(2) DIA costs, not covered above, include: costs relating to interfacing the IDHSC network with the COINS network; costs relating to secure communication facilities for COINS users in the IDHSC net; costs relating to providing COINS support to the intelligence components of the Military Services and the U&S Commands. We have no estimate of these costs, which would be a charge against DIA in the IDHSC Program Element of the GDIP.

(3) Additional costs, attributable to DIA, CIA/NPIC and NSA, include principally: space and facilities for installation of the mini-computers, personnel to operate them, the cost of software required to interface the mini-computers to the host computers in each agency. We have no estimate of these costs, which would be a charge against the individual agency program budgets.



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STATINTL g. ASD(I) Plan for COINS Development - Not Related to Upgraded Communication Network. The ASD(I) fiscal plan proposes funding for the activities identified below. This funding totals [redacted] in FY-74 STATINTL and [redacted] in FY-75.

(1) Existing contract continuation. The costs of existing contracts are for the continuation of the COINS program management efforts, using outside consultants. These contracts involve preparing statistics and evaluations on COINS system usage STATINTL and related data useful to the COINS Management Office for improving operational effectiveness of the network. The ASD(I) plan projects these costs at [redacted] in FY-74 and [redacted] in STATINTL FY-75.

(2) Additional contracts. This item appears in the ASD(I) fiscal plan in the amount of [redacted] for FY-74 and [redacted] for STATINTL FY-75. The following projects are planned:

(a) A study contract to address the problem of the STATINTL separate and non-uniform retrieval languages required to be used with individual host computers. Can a single, common language be devised for calling up computers in the COINS communication network? The present problem of non-uniform language and procedures between computers will become more difficult as new host computers join the network. The cost of this study is projected at [redacted] yearly for STATINTL FY-74 and FY-75.

(b) A Users Support Sub-System is needed. This project is to develop on-line aids and techniques as a means of providing immediate assistance to COINS users. The cost is STATINTL projected at [redacted] in FY-75.

(c) A Network Management Information Sub-System is needed. This project is to develop an on-line mechanism for collecting, processing, and utilizing available logging information in each agency as a means of managing the COINS network and measuring its operations, performance and utility. The cost is projected at [redacted] in FY-75. STATINTL

STATINTL (3) Security and monitoring program. This appears in the ASD(I) fiscal plan in the amount of [redacted] for FY-74 and STATINTL [redacted] for FY-75. These funds relate to the following projects:

(a) Security for ARPA-Type Network. The purpose here is to "develop techniques and hardware for handling information from multi-security compartments. This will include the development of a ... system to automatically authenticate users, terminals, and computers to each other."

(b) Security Monitoring System. The purpose here is to "design and develop an independent monitoring system that will continuously monitor hardware, software and communication facilities throughout the network and immediately alert appropriate personnel of any malfunction or possible breaches of security."

(c) Computer Security Laboratory. The purpose here is to create a "community facility in NSA R&D to develop and design techniques for security systems and attacking supposedly secure systems."

(4) Other possible costs. In reporting to the PFIAB Science Panel on 6 September 73, the COINS Project Manager called attention to the probable need for additional storage facilities for new COINS files, as a result of the initiatives being set in motion by the joint files working group. This is not referred to in the ASD(I) plan. It is a cost that will eventually fall on individual agencies.

3. DISCUSSION

a. The ASD(I) proposal for an upgraded COINS communication system should be approved by the DCI. The technical and fiscal planning by the Project Management Office at NSA and by ASD(I) have been done by qualified professionals. The work performed needs to be done, and is the next necessary building block for an improved COINS system. CIA endorses the technical plan for this stage of the work. DIA has not responded officially, but we understand informally that they are in agreement on the COINS network plan as it applies to the Washington area. DIA appears to feel that the plan trespasses somewhat into matters involving DIA's responsibility in connection with IDHSC and WWMCCS worldwide.

b. Approving this COINS communication network should be seen only as foundation building; it does not directly and immediately improve COINS for analysts.

(1) Only a minimum network between DIA, NSA and NPIC can be created in the 12-month time frame referred to in the ASD(I) proposal, and all-around cooperation will be necessary.

(2) Doing all the tasks proposed in the detailed implementation plan will require 28 months, according to the Implementation Schedule of that plan.

(3) When this work is completed, it will amount only to an improved transmission belt that has the technical capability of giving a more responsive and flexible tool for analyst users.

(4) This work does nothing directly to solve security problems, nor to improve the substantive quality of COINS files, nor to overcome the largely unsolved cultural problem of analyst-computer interface.

(5) It is possible that there may be some degredation of the current capability of COINS to serve analysts during the period when the improved communication network is being established. The plan calls for the existing network to be maintained with "minimum degredation" of service.

c. Cost implications to individual agencies re the upgraded COINS communication system are not identified in the ASD(I) presentation to IRAC.

(1) The fiscal plan proposed by ASD(I) only identifies costs for the central system.

(2) There are some additional costs to DIA, CIA and NSA, principally related to programming the interface between the mini-computers to be supplied to them (without charge) and their own host computers.

(3) This cost should be anticipated by DIA and NSA and will be reflected in their GDIP and CCP programs, which are reviewed and approved by ASD(I).

(4) In the case of CIA, DCI should be advised by CIA management that this matter is recognized and will be taken care of on behalf of CIA/NPIC in the Agency budgetary process.

With the foregoing caveats, we have no reason to disagree with the ASD(I) fiscal plan.

d. ASD(I) Fiscal Proposals for COINS Development - Not Related to Upgraded Communication Network

(1) The ASD(I) proposal for funding the continuation of existing contracts relates to the present level of consultant support to the Project Management Office. The work is necessary, and will become more complex as the COINS system expands. DCI should approve this effort.

(2) The ASD(I) proposal for additional contracts provides expanded support to COINS management, particularly in seeking to assist analysts to use the system and to measure its operations, performance and utility. All of these goals are proper if we are really serious about making a significant advance in the capability of a COINS-like mechanism for the community.

(a) ASD(I) should provide more specifics on the above tasks. Some are not planned until FY-75. This will give DCI and ASD(I) staffs, together, opportunity to sharpen our focus and improve our mutual understanding of how to go about these tasks.

(b) For fiscal planning purposes, however, DCI should support the ASD(I) proposals.

(3) A uniform retrieval language is the subject of an additional contract proposed by ASD(I). At present, separate and non-uniform languages and procedures (protocol) are required for each agency's host computer in the COINS system, and the problem will become more complex as the system is expanded to tie in new participants. STATINTL

(a) ASD(I) proposes a two year effort, funded at [redacted] each year. Considerable technical opinion in the community doubts that this level of funding will be adequate.

(b) The problem is of major importance for developing a COINS system whose files are easily accessible by users. It should receive prompt attention. The solution is not readily apparent, and the longer we delay the more diverse systems will become operational.

(c) Some work in this area is now being addressed by WWMCCS planners, who are developing a common language (WWDMS) that participants in WWMCCS will be encouraged, but not required, to use. Other diverse systems are believed to exist at SAC and with the Military Airlift Command, for example. Rome Air Development Center (RADC) has an interest in the problem in connection with IDHS.

(d) ASD(I) should brief DCI Staff in detail prior to entering into a study contract for COINS. This may be an area where DCI may wish to have an independent source of judgment, and the cost-benefit considerations of this project could be a subject on which DCI would want to seek technical advice, both within CIA and from outside consultants, as well as from ASD(I).

(e) For fiscal planning purposes, however, DCI should support the ASD(I) proposal. And, once the concept and scope of work is agreed on between ASD(I) and DCI, we should look to ASD(I), as Executive Agent, to carry through the effort.

(4) Security and monitoring program. ASD(I) proposes projects at a total cost of [redacted] Three STATINTL efforts are involved, as follows:

(a) Security for an ARPA-Type Network, including multi-level security; Security Monitoring System for COINS when the network is in operation; and Computer Security Laboratory, at NSA.

(b) The CIA response to the proposal for upgrading the COINS communication network notes that "the issue of security has not been adequately treated, and ... network planning should incorporate security protection as a deliberate and necessary design goal."

(c) In CIA, between January 1972 and January 1973, the Office of Security with contractor support conducted its first comprehensive security analysis, testing and evaluation of a major CIA remotely accessed resource-sharing computer system. The project covered not only the traditional aspects of physical protection and personnel access but also the hardware and software security attributes of the system, an IBM 360 Model 67 under Control Program 67. The CIA Director of Security reports:

> "(a) strong evidence of serious security weaknesses in the operating system, consonant with a similar conclusion in the security test of the DIA On Line System (DIAOLS); and
>
> "(b) convincing argument that the pursuit of such test efforts is profitable and valid as a basis for system security certification and/or remedial action."
>
> Director of Security memo to
> IC/IHC, 1 November 73 (C)

(d) ASD(I) did not present a description of its security proposals along with the cost figures contained in their transmittal of 4 October 73. Our information on the direction of their planning is derived from the COINS Project Manager's presentation to PFIAB on 6 September 73.

(e) There is no doubt that there is a major group of problems under the general heading of computer security, and that funding is needed to study this area.

(f) Some of the activities, illustrative of the thrashing around in government and industry, to "get a handle" on the problem of computer security include the following.

(i) ASD(Comptroller) chairs a Computer Security Committee.

(ii) The Navy's Ship R&D Center held a symposium on this subject in 1972.

(iii) A September 73 draft of the National COMSEC Plan for Computer Systems, prepared by NSA for the U.S. Communications Security Board, is now circulating for comments.

(iv) OSD reportedly has sent a letter recently to the Director, NSA proposing that NSA be responsible for computer security within DoD, and requesting views and comments on this proposal.

(v) OMB has been pressing the National Bureau of Standards (NBS) to serve as a focal point for computer security between the US Government and industry, with NSA becoming responsible for this subject within the Federal government.

(vi) The Executive Secretary, IHC has just returned from attendance at a 3 day symposium, sponsored by IBM, on this subject, with participants from industry, government and academia.

(g) Expert commentary. Dr. Ruth Davis, Director of the Institute for Computer Sciences and Technology, National Bureau of Standards, addressed the USIB Intelligence Information Handling Committee (IHC) on 15 November 72 on this topic. Her comments included the following:

"10. Dr. Hellner asked how far away we were from a reasonable solution to the multi-level problem. Dr. Davis thought that it would be about 2 - 2½ years until the first step is completed; i.e., providing guidelines which will handle a majority of the computer security problems in the public sector. For adequate technological results that would be used for the next generation system architecture, and addressing computer utilization in such a way that it is not necessary to come up with a patchwork solution which would thereby decrease cost effectiveness, she thought the answer was about 4 years away. This meant assimilating the results of all agencies' R&D whether it was in the intelligence community or not and developing mechanisms to apply it properly."

Minutes of 51st IHC Meeting

(h) In the light of these many efforts, it may be desirable for the intelligence community to develop an overall plan for addressing this group of problems. Further, more specific proposals by ASD(I) would be helpful. In any event, problems with a direct applicability to COINS may be distinguishable from the more general concept of a computer security laboratory at NSA.

(i) The DCI has a direct responsibility. The statutory charge on the DCI to protect intelligence sources and methods leaves to him the ultimate responsibility for passing judgment on whatever resolution is finally proposed for these problems after studies and tests have been completed.

(j) There has been a history, extending over a good number of years, of DCI concern with these problems, both in the USIB Security Committee and the USIB Intelligence Information Handling Committee. Those two groups have worked together to bring their special insights to bear in a joint effort. The latter committee (IHC) has been the point of contact with the National Bureau of Standards.

(k) In these premises, DCI should consider indicating to ASD(I) that this is an area of such diversity that a combined DCI-ASD(I) approach appears desirable. A working arrangement, involving ASD(I), the COINS Project Management Office, and the DCI's staff and committee mechanisms, should be agreed to.

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